

ABSTRACT OF THE DISCLOSURE

An optical element which controls both the phase and irradiance distribution, thereby completely specifying the E-field, of light, allowing completely arbitrary control of the light at any plane. Such an optical element includes a portion that controls the phase and a portion
5 that controls the irradiance. The portion that controls the irradiance is an apodized irradiance mask having its transmission varying with position in a controlled fashion. This apodized irradiance mask is preferably a pattern of metal. In order to insure a smoothly varying pattern of metal with minimized diffraction effects, a very thin mask spaced from a substrate is used to provide the metal on the substrate. The apodized irradiance mask may be placed
10 directly on the phase control portion, or may be on an opposite side of a substrate of the phase controlled portion.